be in a position for minimum deviation. The pivot at *h* is removable, so that the right-angled arm *A R*, can be fixed at *g f*, *c b*, &c., as one or more prisms are required, the other prisms of course being removed.

ART. XXI.—*Some Notes of Observation with the Melbourne Great Telescope.* By FARIE MACGEORGE, ESQ.

[Read 12th March, 1871.]

Mr. Le Sueur's last recorded observations were on the 9th May, 1870, and from that time until the 1st August, 1870, when the Great Telescope was entrusted to me, there appears to have been a period of almost uninterrupted bad weather, during which Speculum A was repolished by Mr. Le Sueur. With that speculum, whose performance has been perfectly satisfactory, the observations from which I now make a few extracts have been made.

A Comet (2 of 1870 ?) of which the elements are supplied in the *Astronomische Nachrichten* of June 1870, appearing to be tolerably favorably situated after perihelion for observation from the Melbourne Observatory, Mr. Le Sueur having computed its place from the elements furnished by that journal, turned the Great Telescope upon it at 7 p.m. 13th August, 1870. It was then in the constellation Centaurus in about RA 10 h. 45 m. S.P.D. 38° 29′, but from the want of a convenient star of reference no differential place could be obtained on that evening. It corresponded with the usual description of telescopic comets, being nearly round, tailless, condensed towards an ill-defined nucleus of a few seconds diameter nearly central, and thinning away outwards until lost against the sky, the approximate total diameter being about 3′ 0″. The Spectroscope showed the usual cometic lines, one faint band reading 26-9-3 of the Grubb Spectroscope about midway between the *F* and the *b* groups which with same adjustment read 25-7-3 and 27-5-5 respectively. At each side of this, faint glimpses of still fainter bands once or twice appeared, but both Mr. Le Sueur and myself failed, after long watching, to obtain a reading of either, and on subsequent occasions the object had become so faint that no spectrum whatever could be obtained, appreciable to the eye. The central line appeared, however, to fall approximately into the position of the brightest of the Nitrogen lines.

On the 22nd, 25th, 26th, 27th, 28th, 29th, and 31st Aug., the comet was observed and a number of differential places obtained with the Great Telescope, some also with the small equatorial refractor. The weather then again broke up, and as the comet set early, or rather became too low for observation, and had not risen sufficiently to observe before daylight in the morning, no fair chance of seeing it again occurred until the 14th Sept., when it was searched for without success, the evening not being good. On the 15th I again found it and obtained a number of differential readings by means of the Grubb micrometer and the chronograph. On the 20th and 21st, the comet appearing exceedingly faint and aurora interfering I obtained a number of similar differential readings, but the position became continually worse for observation. On the 27th Sept. it was again with difficulty observed, and on the 11th Oct. the last glimpses of this visitor were obtained only by sweeping the telescope rapidly over its computed place and so gaining the effect of quick contrast with the sky; but, of course, no differential place could be recorded. The great light-collecting power of a 4 ft. aperture, however, showed to great advantage in these observations; by which the object was followed for a month longer than was possible to the other instruments available at the Observatory.

Moon.—One half of each lunation being lost for the purposes of work upon the nebulæ—the special work of the great equatorial, owing to the quantity of diffused moonlight which obliterates nebular details, I have endeavoured, as much as possible, to utilise these moonlight evenings by devoting such part of them as can be spared from public visitors to occasional work upon the moon itself, the planets, and double stars—conducted under some difficulty, as no means have been yet provided for screening the eye from the painful glare of the moon, or for reducing or altering the shape of aperture to obtain clear definition and ease to the eye for micrometer measurements. But I give a few extracts which may prove interesting.

Copernicus.—2nd Dec., 1870—*Terminator* (or line of sunrise), 50 miles beyond Copernicus, which has four central peaks nearly on lunar parallel; the two most easterly close together. Several other peaks of inferior altitude appear under higher illumination, the whole group standing on a floor which gradually rises from the foot of the interior slope of the vast ring 50 miles in diameter. Seven or eight consecu-

tive ranges rise terrace-like from the floor to the summit of this ring. The bright rays (of which Copernicus forms a centre) are visible for hundreds of miles in every direction up to the very edge of terminator, where, although any difference of level of 10 feet would produce a visible shadow, these rays still neither receive nor throw a shadow. Some parts of them appear dislocated by the crossing of ranges, &c., over their path. They seem evidently *dykes*—selenologically speaking—of a more reflective kind of rock or rock of a lighter color than the country through which they pass, and which they have ruptured and supplanted. In one place a ray passes completely over the side of a crater-ring, yet conforms itself to the general surface of the crater; it intersects, indicating apparently that the surface must have been still in a plastic state after the date of Copernicus, and the radiating streaks from it, and at the time of the formation of the latter crater-ring.

Copernicus.—5th Dec., moon nearly full—Copernicus under full illumination shows terraces of varying brilliancy arguing different dates of formation. The bright rays not more conspicuous than when on edge of terminator, but having a more *cloudy* look—four central peaks of same appearance still.

Maria.—Swept the Telescope over the different plains, and was unexpectedly struck with the green tint in many places pervading them, apart from the uncorrected chromatism of the eyepiece (power 255).

Aristarchus.—The crater Aristarchus is about 100 miles from terminator. It appears many times more bright than the brightest object elsewhere—a painful brilliancy which gave, unlike all other lunar craters, the impression of heat as well as light. The shadow from the western wall of the ring is almost obliterated by the apparently inherent light of the interior. The steep central hill appears to-night to have a minute crater on its summit, very apparent at times, at others dim and vapoury-looking. A range visible beyond Aristarchus to the N.E., stretching as it were across the horizon 50 to 70 miles distant, and round the two terminating bluffs of this range extended a vapourous-looking film, which encircled, also, Aristarchus at a distance of, say 30 miles. Within this girdle of haze, Aristarchus, and the range, Herodotus, &c., appeared sharply defined—sharply comparatively speaking only, for these objects are all near the limb, and in the Great Telescope all objects near the moon's limb appear less distinct

than those near the centre. Even the terminator line itself grows manifestly less distinct as it approaches the moon's limbs; an appearance difficult to explain apart from a supposition of a lunar atmosphere of some kind. Yet the Spectroscope appears to negative such a supposition.

Spect. Arist.—7th Dec., Spectroscope on Aristarchus shows at same time three spectra—one from central hill, and one from each side of the ring, side by side, brighter than from rest of moon, yet with no lines indicating incandescence, or additional absorption lines beyond those due to the earth's own atmospheric absorption, as far as I could observe with certainty.

Earthshine.—25th Dec. Terminator on Mare Crisium. Turned on the dark, or rather earth-lit portion of the moon, of which I was surprised to find that the large light-collecting power of the Great Telescope enabled me to distinguish all the chief features, the well marked boundaries of the plains, and the craters down to the middle size. Aristarchus *comparatively* as bright as ever but no appearance of intrinsic light, a broad bright ray shooting off S.E. by Herodotus. The shadow of the western side of the crater Aristarchus was visible on the floor, and the eastern interior slope was brightly illuminated by the earthshine. Grimaldi and Plato appeared as dark proportionately as at full moon, and indeed all parts appear much the same relatively as at the full.

Copernicus.—Copernicus conspicuous with its system of bright rays divergent—the one which intersects the wall of Lambert precisely the same.

Rays.—These rays appear, in fact, of the same brightness, relatively at whatever angle of illumination they are viewed, suggesting shade or tint peculiarity, more than peculiar reflective properties.

Photometry.—Systematic photometric comparisons at varying angles of illumination would probably bring out interesting analogies with earth formations.

Appenines.—The Appenines also come out well in Earthshine and stand up in bold relief—a splendid range. To-night, as on former occasions, I looked long and carefully for Schroeter's supposed twilight-streaks from the bright cusps of the Moon, but did not see anything to be sure of. The blaze of light from the bright portion of the Moon so illuminated the field in the vicinity of the cusps that it is hard to say whether the apparent twilight is or is not real.

Lunar Atmosphere (?)—Upon the same question of atmosphere in the moon, I note on the same evening :—

"While observing the dark disc of the moon I saw a star of medium magnitude approaching, so I closely watched its occultation. On reaching the limb at a slightly indented part, it appeared for an instant to flatten itself out along the surface and then suddenly to disappear. I state, of course, the effect upon my eye for what it is worth, as a single instance. This occultation took place about 3 h. 30 m., sidereal time (26th Dec. 1870), moon pretty low."

Sirius.—Not knowing when to look for Lassell's companion of Sirius, I proceeded to note all the faint stars which I saw in its vicinity, very difficult to make out owing to the excessive brilliancy of this star in so large a telescope, and on the 9th Dec., 1870, after a series of micrometer measures of the faint star now called *d*, I note as follows :— "Calling distance between S^s and d = 10 parts, * 20 mag., 15 parts dist. from *S*, and making angle of 5° preceding line joining *S* and *d*, referred to *d*. Another * 20 mag. 45° following same line, 4 parts dist. from *d*, very difficult, with 6th power (881), definition indifferent." Two months afterwards, in looking over some miscellaneous observations of Lassell's, I fell upon the one relating to his discovery which, with your permission, I will now supply : it is at page 38 of vol. 36, Mems. R. Astronomical Society, and it is as follows :—

"1865, Jan. 13. The Comes strikingly plain ; angle of position 76°·67 by 6 measures, with power 678. While trying to measure the distance, the images became greatly confused, and I had in consequence to give up observation. Mr. Marth afterwards endeavoured, on some abatement of the disturbance, to obtain some measures of distance, but without success. The remaining observations relating to this object are entirely by him.

"While trying to get a measure I remarked to my surprise a star nearer to *Sirius* than the star "*d*," which I had not seen before. (Mr. Lassell, Prof. Struve, and I had not perceived last year any star beside Clark's Comes nearer to *Sirius* than the star *d*.) This new star has perhaps half the brightness of *d*, and is considerably fainter than Clark's Comes. A rough observation with power 405 gave its position 126°·6, and the star *d*, 164°·6, distance about 2′. The perpendicular line from the new star upon the line of

Sirius to *d*, cuts it about midway, but I could not get an exact estimate, and clouds put an end to further trials.

"1865, Jan. 14. The new star of yesterday is very plain.

Position Angle	of	Comes	77°·63	by 3 measures.
,,		New Star	127·03	2 ,,
,,		*d*	163·89	3 ,,

"Interrupted by clouds. which had been threatening for some time; and I was obliged to close in all haste, to save the speculum from the rain which shortly began to fall.

"Feb. 4. Clark's Comes very plain; 11th magnitude; but is too windy for measures. The star of the 13th January very faint, but certainly seen.

"March 23. Image of *Sirius* too confused for observation. Comes and star of 13th January very plainly seen.

"March 24. The image struck me as having never been better. Comes very plain; position by 6 measures with 405, 76°·31; but the star is two hours from the meridian. The star of 13th January, though faint, is undoubtedly seen."

From this it appears that the new star noted by Lassell with his four feet, at Malta, corresponds with the one last noted by me. From this it seems that a star which had hitherto escaped such keen observers as Struve, Lassell, and Mr. Marth, had yielded on an indifferent evening at once to the Great Telescope here of the same aperture, without the eye being directed to it, or biassed by any previous information. Yet it has been said that the definition of the Great Telescope is faulty! I have now had some practical acquaintance with it, and have found that the definition is in direct ratio with the goodness of the evening. On one or two occasions the highest powers have been borne with perfect definition, showing that the defects are atmospheric ones not instrumental.

Micrometer measurements of Alvan Clark's Comes, Lassell's Comp^{n} d, &c., have been executed, and the existence of three new stars, which I designate for convenience *f g* and *k* on several occasions suspected. They are all nearer *S* than the star *d* of Lassell's note. Another one suspected by Mr. Le Sueur, *h*, I have also occasionally suspected, but these objects are so exceedingly faint, if existent, that further observation on some nights of first-rate definition is necessary before making any positive statement.

η Argus.—The Great Nebula about η Argus was first observed by the Great Telescope on 27 Dec. last, and I then note :—"Evident changes in η nebula since Le Sueur's sketches, and I notice a small bright duplicate nebulosity, *s.f.* η, like a small nebulous double star. It is too bright to have escaped previous notice, and is not noted by Le Sueur."

Subsequent observation has corroborated this statement, and it is now beyond a doubt, that the enormous physical changes are still taking place, particularly about the lemniscate, and suspected also in the star η itself. But these changes may form the subject of a future paper, and could be best illustrated by a reference to the sketches made at successive periods by Mr. Le Sueur and myself—comparing also with the drawing executed by Sir John Herschel.

Some observations on Jupiter and Saturn, also, may on a future occasion be worthy of your notice, as also, some on the nebula about θ Orionis and others.

Art. XXII.—*Notes on Enhydros found at Beechworth.*

By Geo. Foord, Esq.

[Read April 12, 1871.]

The great mineralogical interest attaching to the curious natural productions called "Enhydros" or "water stones," and the mode of their formation remaining, in many essential particulars, without any adequate explanation, are circumstances which have induced me to believe that any contribution to the knowledge of them, however slight, would prove acceptable, and therefore I offer the following brief note on the subject to your Society.

The sample, the subject of experiment, was a large specimen, weighing over 900 grains, having for its largest section a form closely approaching an equilateral triangle, measuring a little over two inches on each of the sides. For this specimen I am indebted to the kindness of Mr. George H. F. Ulrich. It was, I am informed, obtained from the same site as those described by Mr. Dunn, and it possessed the usual characteristics. The specimen clearly included two separate chambers; in fact, during the course of experiment it was cloven into two separate water stones, of pretty nearly equal dimen-